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NASA TECH BRIEF

Blocking Oscillator Uses Low Triggering Voltage

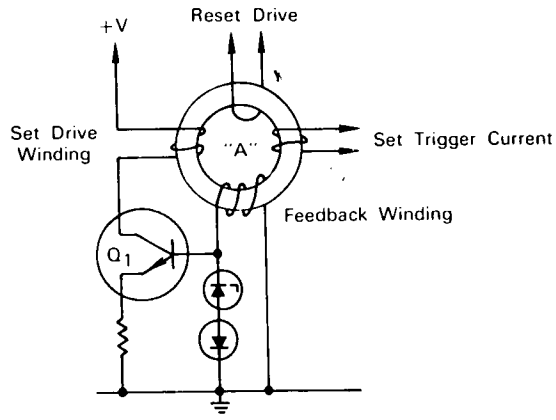

FIGURE 1

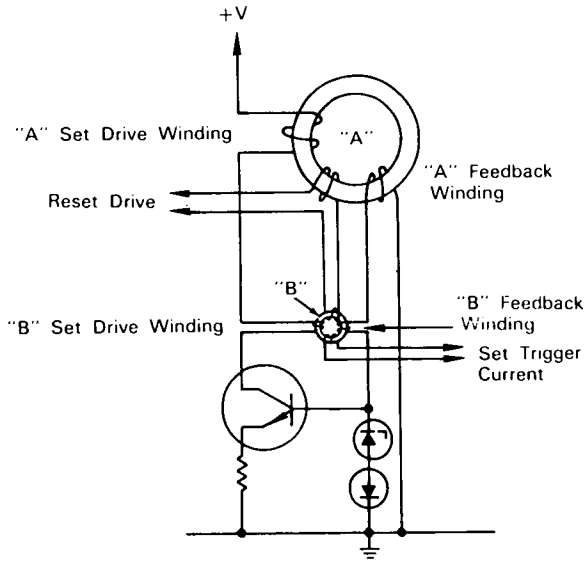

FIGURE 2

The problem: Low-voltage triggering of a blocking oscillator using a square-loop magnetic core and transistor. In order to ensure stability in a circuit of this type, the triggering threshold must be made quite high so that the circuit will not trigger prematurely on the reversible flux change in the core when it has been reset and the reset drive is then reduced to zero in less than a few microseconds. Since the reversible flux increases with increasing core size (increasing total flux), the premature triggering problem is more severe for blocking oscillators which utilize large cores. Thus, in blocking oscillator circuits where the triggering power is conventionally applied to a winding on the magnetic core, a high trigger voltage is necessary.

The solution: Using the conventional oscillator circuit with the addition of a smaller magnetic core to serve as a second blocking oscillator which has a lower triggering threshold.

How it's done: Figure 1 shows a typical blocking oscillator circuit where the transistor is kept active by means of a voltage clamp provided by a zener diode connected from the transistor to ground. The circuit is triggered by applying a drive voltage to core "A".

In the modified oscillator, Figure 2, a small core, "B" is arranged in the circuit to serve as a second blocking oscillator. Since the threshold of core "B" is much lower than that of the main blocking oscillator core "A", the triggering power requirement is considerably reduced. When a trigger voltage is applied to the winding on core "B", a current will flow in the collector circuit of the transistor and through the set drive winding on core winding "A".

(continued overleaf)

This current will have sufficient amplitude to cause triggering of the main blocking oscillator. Core "B" is designed to saturate in a time which is small compared to that required for the large core, and hence the output characteristic (collector current, for example) is virtually unaffected by the presence of the small core. This design also provides for a low dc resistance path for collector-base leakage current to ground.

Notes:

1. Suggested applications for this circuit are computer shift registers, digital displays, and other digital circuits employing blocking oscillators.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   P.O. Box 1537
   Houston, Texas, 77001
   Reference: B64-10017

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Westinghouse Electric Corporation under contract to Manned Spacecraft Center (MSC-58)